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F01 Automatic Soft Close

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Automatic Soft Close (SCA)

Model: F01/F02

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Understand the operation of SCA on the F01/F02

Introduction

F01/F02 Available with Automatic Soft Close Function

The Automatic Soft Close function (SCA) is available and can be ordered as of volume production launch.

The Automatic Soft Close function requires the installation of suitable door locks with drives for Automatic Soft Close (SCA drives).

The particular feature of this Automatic Soft Close function is that the door lock and the Automatic Soft Close drive unit are no longer a single unit. The Automatic Soft Close drive unit is separate and controls the door lock by way of a cable.

This means that the lock and the drive can be fitted separately and the installation space available can be used to the best effect.

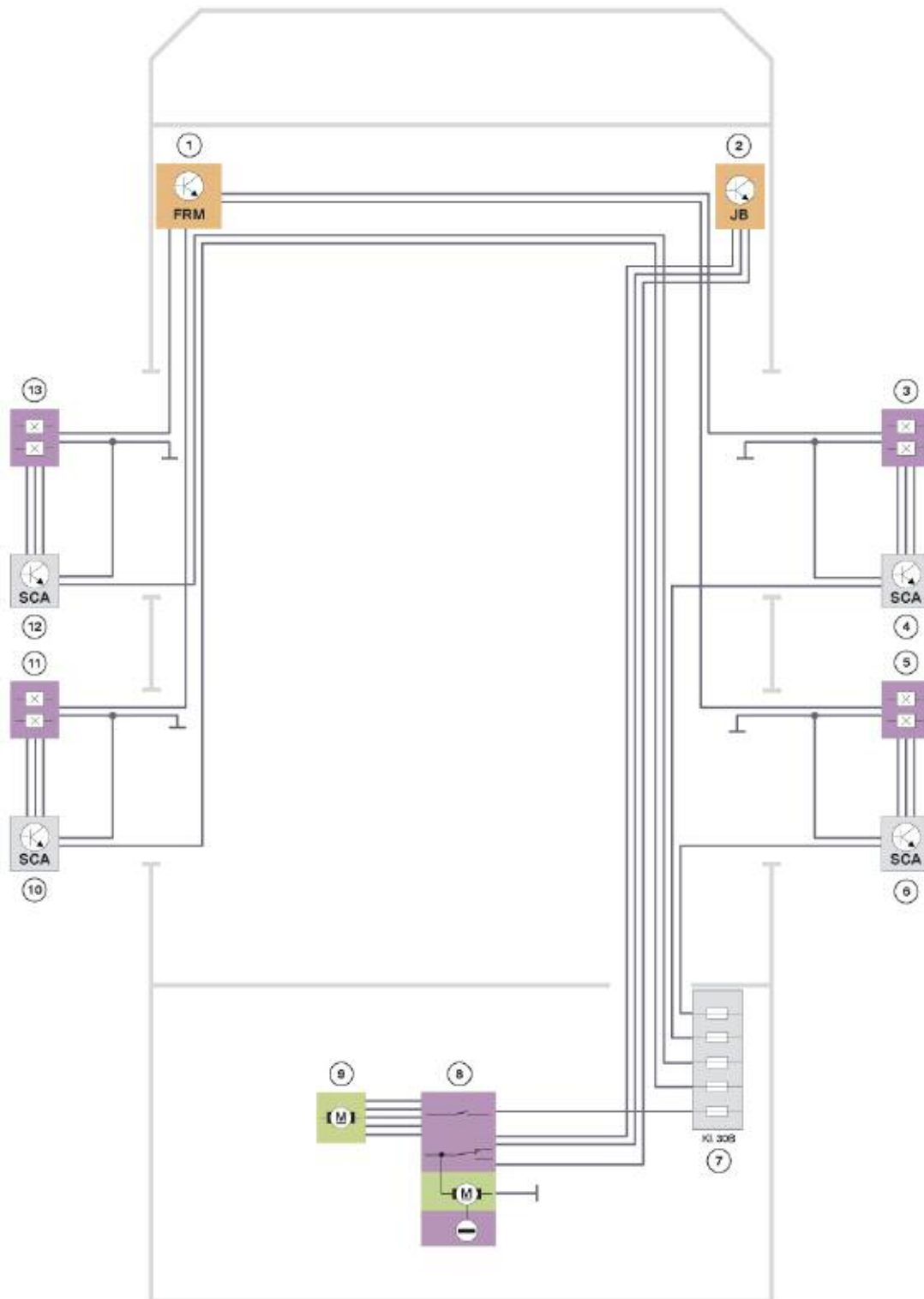
The Automatic Soft Close option is only available for all doors on the vehicle.

The benefit of the Automatic Soft Close function is that the doors only have to be pushed or pulled lightly into the lock. This action starts the Automatic Soft Close function which closes the doors fully.

Note: The Automatic Soft Close function for the trunk is standard equipment and thus is not part of this option.

System Overview

System Circuit Diagram for Automatic Soft Close Function



Index	Explanation	Index	Explanation
1	Footwell module (FRM)	8	Trunk central locking unit
2	Junction box module (JB)	9	Trunk Automatic Soft Close unit
3	Door switch, central locking, Hall-effect sensor for front passenger door Automatic Soft Close function	10	Off-side rear Automatic Soft Close unit
4	Front passenger door Automatic Soft Close unit (SCA)	11	Door switch, central locking, Hall-effect sensor for off-side rear door Automatic Soft Close function
5	Door switch, central locking, Hall-effect sensor for near-side rear door	12	Driver's door Automatic Soft Close unit (SCA) Automatic Soft Close function
6	Near-side rear door Automatic Soft Close unit (SCA)	13	Door switch, central locking, Hall-effect sensor for driver's door Automatic Soft Close function
7	Luggage compartment power distribution box	Kl. 30B	Terminal 30 basic mode

Functions

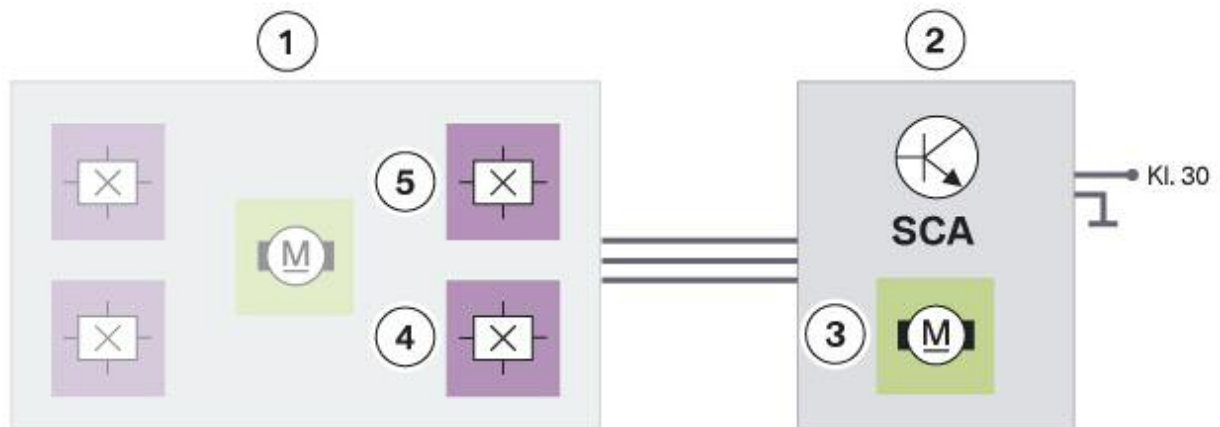
Automatic Soft Close

The Automatic Soft Close function is an autonomous function. The only connection to the car's electrical system is Terminal 30 basic mode (Terminal 30B) and the ground connection. The Automatic Soft Close function is operational as of "Terminal 30B ON".

Circuit Diagram for an Automatic Soft Close System

The electronics for controlling and monitoring the function are located in the Automatic Soft Close function drive.

The sensors for the Automatic Soft Close function are Hall-effect sensors and are located in the locks. The Hall sensors are built into the lock of each vehicle door. One Hall sensor is for the locking pawl, the other for the rotary striker.



Index	Explanation	Index	Explanation
1	Lock in the vehicle door	4	Locking pawl Hall sensor
2	Automatic Soft Close function drive	5	Rotary striker Hall sensor
3	Automatic Soft Close function drive motor		

The Automatic Soft Close function analyzes the status of the Hall sensors. The Automatic Soft Close drive units are operated or moved back to their starting position according to status.

The Automatic Soft Close function drive is connected to lock by way of a Bowden cable and a 3 wire cable.

The following illustration shows where the Automatic Soft Close function drives are fitted.

Location of F01/F02 Automatic Soft Close system



Index	Explanation	Index	Explanation
1	Drive for Automatic Soft Close function in driver's side door	3	Drive for Automatic Soft Close function in driver's side rear door
2	Lock for driver's side door	4	Lock for driver's side rear door

Locking Procedure when Door is Pushed into the Lock

Starting position: Door open, the Automatic Soft Close function is in the standby position.

When the door is closed normally, first the locking pawl (lock) Hall sensor changes its status. The electronics in the Automatic Soft Close function drive start the door closing operation after a delay of 200 ms. This prevents the Automatic Soft Close drive unit starting before the lock bolt is located in the rotary striker. The drive operates the rotary striker by way of the Bowden cable until the Hall sensor for the rotary striker changes its status. The locking pawl is then engaged and secured in the rotary striker. Operation of the Automatic Soft Close drive unit is then stopped and the Automatic Soft Close drive unit returns to its parked position.

When the door is opened using the outside door handle (bow handle) or inside door handle, the system runs back to its original position. This is also known as the standby position.

Note: Only when the rotary striker sensor has changed its status is the rotary striker mechanically locked by the locking pawl. This is particularly important, as only then is it guaranteed that the door is truly closed.

Closing the Door by Slamming

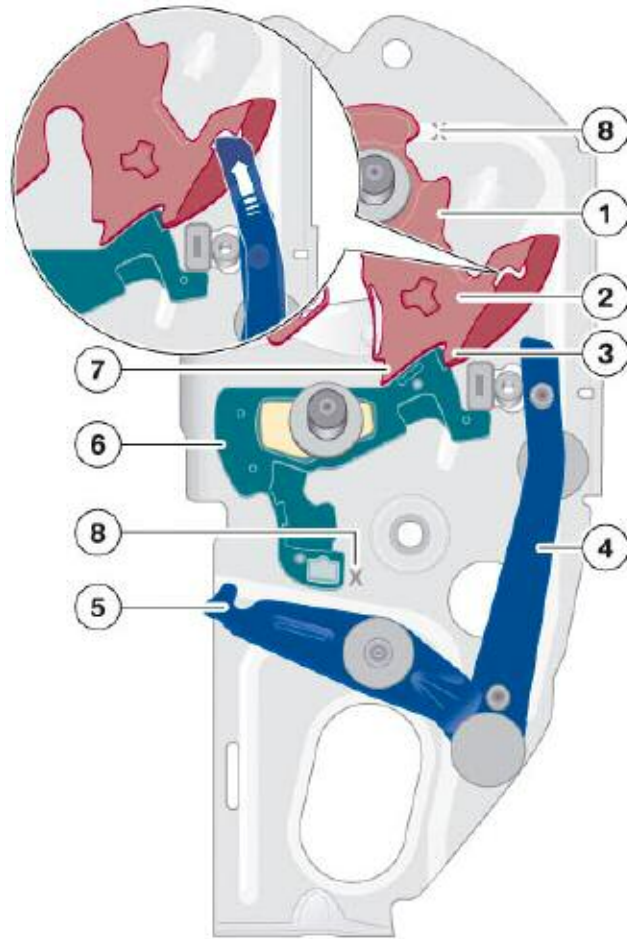
Slamming the door would make closing with the Automatic Soft Close function drive unnecessary. However, since it is essential to ensure that the door is definitely closed, the Automatic Soft Close drive unit is nevertheless still operated for safety reasons.

The electronic circuitry in the Automatic Soft Close drive unit detects the slamming of the door by the fact that the locking pawl and rotary striker Hall-effect sensors have changed their status within a short time.

Anti-repeat Circuit

Every Automatic Soft Close function drive has an anti-repeat circuit to prevent overheating of the Automatic Soft Close function drive. It permits 15 operations (counter incremented up to 15 times) of the control for the Automatic Soft Close function drive. The Automatic Soft Close function drive is then locked electrically for approximately 2 minutes.

Design of the Lock and Drive

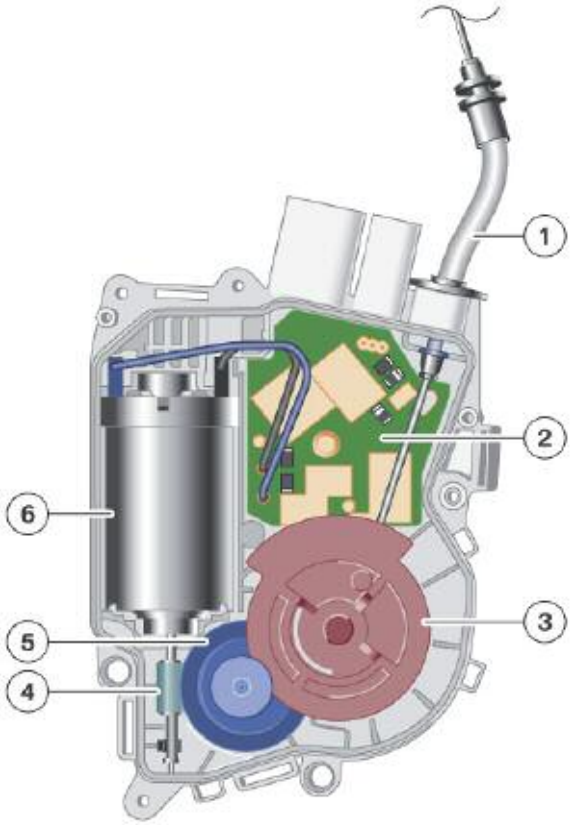


Basic principle of Automatic Soft Close lock as illustrated by E70

Index	Explanation	Index	Explanation
1	Rotary striker	5	Automatic Soft Close function drive actuating lever
2	Rotary striker pull pawl	6	Locking pawl
3	Advance detent tooth for rotary striker	7	Rotary striker main detent tooth
4	Drive pawl	8	Hall sensor installation locations

Light closing causes the advance detent tooth (3) of the rotary striker (1) to engage on the locking pawl (6). The Automatic Soft Close function drive pulls on the actuating lever (5). The actuating lever rotates the rotary striker by means of the pull latch (4) until it is rotated over the main detent tooth (7). The locking pawl can now engage in the main detent tooth of the rotary striker. The rotary striker is thus secured and the lock can no longer open by itself.

Basic principle of Automatic Soft Close drive unit as illustrated by E70



Index	Explanation	Index	Explanation
1	Bowden cable	4	Drive worm
2	Control electronics	5	Idler gear
3	Bowden cable drive wheel	6	Drive motor

The Automatic Soft Close function drive motor (6) has a two-start worm (4) on its shaft. This permits drive in the CLOSE direction for the Automatic Soft Close function. The rotary motion of the drive worm is transferred to the driven wheel (3) by the idler gear (5). The drive gear transfers the rotary motion to the Bowden cable (1). This means that the actuating lever in the lock is pulled by the Bowden cable and thus the vehicle door is fully closed.

Service Information

Lock and Drive

The lock and the Automatic Soft Close function drive are a closed unit (modular). This means that a faulty lock or Automatic Soft Close function drive cannot be replaced individually. Opening the drive, for instance, destroys it, and perfect operation is no longer guaranteed. The Automatic Soft Close function drive is inseparably fastened to the lock. The lock and the Automatic Soft Close drive unit can only be ordered together as spare parts.

Note: There is no diagnostic function for the Automatic Soft Close function drive in the diagnostics system. Retrofitting the Automatic Soft Close system would be very complicated and is therefore not envisaged.

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NOTES

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